

WE CLAIM:

1 1. A method for remote layering in a wireless packet switched network having
2 autonomous nodes, said method comprising the steps of:

3 ^{Fig 2}₁₀₁ processing a layer at a first node to produce remote layered data packets;

4 ²¹⁰² transmitting said remote layered packets to a second node; and

5 ²³⁰ transporting, at said second node, said remote layered packets to a target
6 node.

1 2. The method of claim 1 wherein said step of layer processing comprises
2 the steps of:

3 combining upper layer packets with data at said processed layer to produce
4 lower layer data packets; and

5 adding a label to said lower layer data packets to produce remote layered
6 data packets.

1 3. The method of claim 2 further comprising the step of adding an internet
2 protocol header to the remote layered data packet so as to create an internet
3 protocol encapsulated packet.

1 4. The method of claim 3 wherein said step of transmitting comprises the
2 step of sending said encapsulated packet to the second node via an internet protocol
3 network.

1 5. The method of claim 4 wherein said step of transporting comprises the
2 step of relaying said remote layered packets to said target node.

1 6. A method for soft handoff of a mobile from a serving base station to a
2 target base station in an internet protocol based code division multiple access
3 network, said method comprising the steps of:

4 establishing a cross layer tunnel between the serving base station and the
5 base target station;

6 transmitting, over the air, data from the serving base station to the mobile;

7 ^{Fig 5} sending copies of said transmitted data from the serving the base station to
8 the target base station through the cross layer tunnel;

9 transmitting, over the air, said sent data copies from the target base station to
10 the mobile; and

11 combining, at the mobile, said copied data from the target base station with
12 the data from the serving station to perform soft handoff.

1 ^{Fig 6} 7. The method of claim 6 wherein said step of establishing a cross-layer
2 tunnel comprises the sub-steps of:

3 combining, at the serving base station, upper layer packets with data at one
4 layer to produce lower layer data packets;

5 adding a label to said lower layer data packets to produce a remote layered
6 data packet; and

7 adding an internet protocol header to the remote layered data packet so as to
8 create an internet protocol encapsulated packet, the internet protocol encapsulation
9 establishing said cross-layer tunnel.

1 8. The method of claim 7 wherein said step of sending comprises sending
2 said IP encapsulated packet via an internet protocol network to the target base
3 station.

1 9. The method in accordance with claim 8 wherein said step of combining at
2 the mobile comprises the sub-steps of:

3 comparing the data received from the serving base station with the data
4 received from said target base station;

if said step of comparing indicates a match, then combining the data;

if said step of comparing does not indicate match, then further comparing N data blocks from the serving base station with the target base station until a match is obtained.

10. The method of claim 9 wherein N is greater than or equal to three (3).

11. In an internet protocol based code division multiple access network, a node for performing remote layering, said node comprising:

means for producing upper layer data;

an element for combining said upper layer data with lower layer data, said element having first and second outputs onto which said combined data appears;

means for adding a label to the first of said combined data to produce labeled data;

means for encapsulating said labeled data to produce encapsulated data; and

means for transmitting said encapsulated data over an Internet protocol network.

12. In an internet protocol based code division multiple access network, a node for performing cross layer switching, said node comprising:

means for receiving an encapsulated packet from an Internet protocol network;

means for demultiplexing said encapsulated packet to produce a packet having data and a label;

means for transmitting said data over the air to a mobile based on said label included within said packet.

13. A system for providing internet protocol data to a wireless communication mobile when said mobile is in a soft-hand off region, said system comprising

3 a serving base station for said mobile,
4 at least one target base station for said mobile,
5 means for transmitting a data packet unit from said serving base station to
6 said mobile,

7 means for transmitting a copy of said data packet unit from said base station
8 over an internet protocol network to said at least one target base station, and

9 means for transmitting said copy from said at least one target base station to
10 said mobile together with said data packet unit from said serving base station .

1 14. The system in accordance with claim 13 wherein said serving base station
2 includes means for producing remote layered data packets for said data packet unit.

1 15. The system in accordance with claim 13 wherein said serving base station
2 includes means for forming an encapsulated internet protocol packet comprising said
3 copy of said data packet unit, a switching label, and an internet protocol destination
4 address corresponding to said at least one target base station.

5 SUB AB > 16. The system in accordance with claim 15 wherein said target base station
2 includes means for removing said internet protocol destination address from said
3 copy of said data packet unit and means responsive to said switching label for
4 determining an outgoing channel to said mobile.

1 17. A system for providing a soft hand-off of a mobile from a serving base
2 station to a target base station in an internet protocol based code division multiple
3 access network, said system comprising

4 means for transmitting a data packet unit from said serving station to said
5 mobile,

6 means at said base station for combining upper layer packets with data at one
7 layer to produce lower layer packets, for adding a label to said lower layer data

8 packets to produce a remote layered data packet, and for adding a header to said
9 remote layered data packet, to produce an encapsulated internet protocol packet
10 including a copy of said data packet unit,

11 means for transmitting said encapsulated internet protocol packet to said
12 target base station; and

13 means, at said mobile, for combining said copy of said data packet unit from
14 said target station with said data packet unit from said serving base station to
15 effectuate the soft hand off.

Added A'